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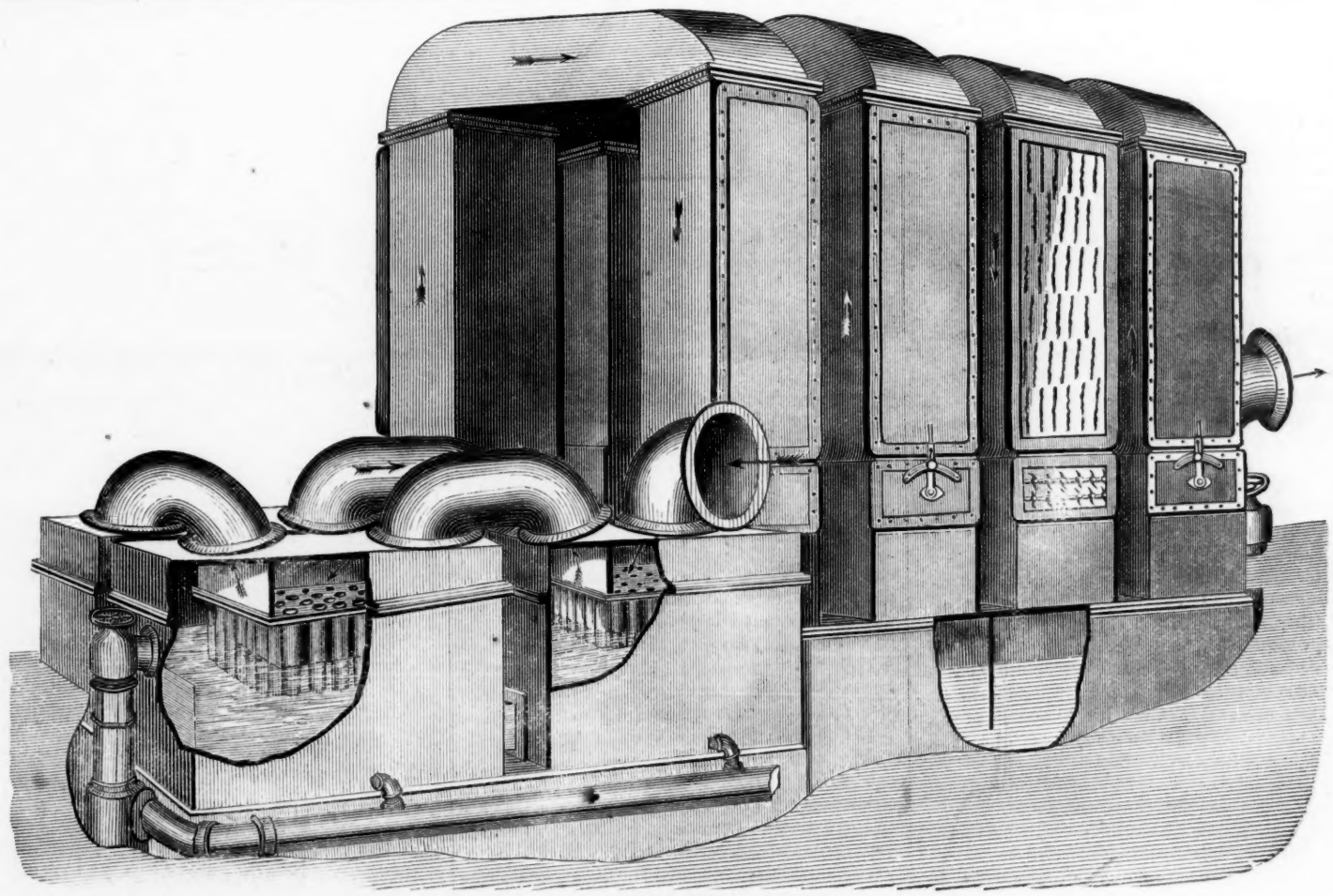

A PERSPECTIVE VIEW.

The Improved Patent Gas Scrubber of the St. John and Rockwell Company.

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In the issue of January 2d, 1875, my attention was called to the examination made by Prof. Wurtz, of the action or working of the St. John and Rockwell Company's Gas Scrubber, as employed at the Harlem Gas-Light Company's works; also in that of January 16, which has a cut of the Scrubber—as well as the examination and report of Prof. Chandler.

It would seem that all that could be *has* already been said; but as it has been promised that I should be heard from upon the subject, I now propose to give some ideas that may not be altogether new, yet will possess some poins of interest.

The cut which appears in this issue embraces nearly all of the improvements that have been made since it was introduced at the above works.

We propose to use four boxes, as shown above. The vapors are conducted by the main pipe to the first box, where it enters, as indicated by the arrows. This compartment is made absolutely tight, excepting the dip-tubes, the gas is then forced down the tubes, which are submerged in the liquid products of the coal tar that are brought forward by a separate pipe from the hydraulic main to a given depth. The bottoms of the tubes have immediately, at their lower ends, a mesh work of a much smaller diameter, or any gauze work or wooden breakers, so that the volume of the gas is divided many hundred times, insuring the requisite action desired. After passing this series of seals, it is then conducted to another of the same character, and so on, until it has passed through the boxes. It then enters the first of the series of upright pipes, which are provided with a lattice work and corrugated plates (as shown by the open pipe), it is then passed through this series of upright pipes, and then makes its exit to the purifier. The liquids are brought forward by the separate pipe shown, and are constantly flowing through the scrubber from beginning to end. The question may be asked—what is all this for? It has once been separated, and why mingle or bring it into contact again?

I will say that all the advantages claimed for this Scrubber rest upon this—

It is constructed upon three great principles of natural law that are incontrovertibly true, viz.—1st.,

cohesion; 2d, solution; 3d, the combination of the alkaline ammonia, with the carbonic and hydrosulphuric acids neutralizing the acid, and fixing the ammonia beyond evolution—

1st. Cohesion—It is by this law that all traces of tar are completely arrested. It cannot be possible for any tar, soot, or materials of this kind to pass through the machine as constructed as per cut. As soon as the atoms of tar that are held in suspension, in the gas that is swept forward, touch the liquid in the boxes, they are instantaneously resolved into the liquid, and cannot possibly be liberated again without the application of heat. The tar has very frequently been the source of great annoyance to all gas manufacturers; a reduction of temperature, particularly in the winter season, will often be the cause of its appearing in the purifiers. Often the jets, or perforated discs in the condensers generally employed, will become closed by it, which causes them to be frequently opened and cleaned, notwithstanding the quantities of water employed. Indeed as yet there has been no surety or guarantee presented, except this new device, against this troublesome material. The tar question has been quietly laid upon the shelf, never again to appear as a source of trouble or annoyance. This scrubber embraces one very important feature—that is to say, it is subject to no change in its action. It is of no consequence how much or how little gas is made, it is ever the same, for the quantity of liquor is always in the same proportion to the vapor, every ton of coal employed giving 9,500 or 10,000 feet of gas, at the same time yielding from 20 to 24 gallons of liquid, and it makes no difference how much or how little is made, the action is ever the same. Again; the liquid is flowing through the scrubber much like a brook or stream, and no deposit *can* take place; it enters the first box with the vapor, and they both pass along in harmony together until their final separation takes place at the outlet. *So much for the tar.*

Next is the naphthaline—This is a very troublesome material, and no method heretofore employed has obviated the difficulty.

This scrubber has not, nor ever will permit naphthaline to be of any source of trouble whatever. This is another very important matter, no clogging of main pipes or burners, no trouble to manufacturer or consumer, here both being very much benefitted by it. It is dissolved out of the vapor by the coal oils, such as benzole and coal tar naphtha, and the provoking, troublesome, defiant substance is quietly at rest with its colored friend tar.

Again; its capacity. The question is often asked—of what capacity is your condenser? Is it constructed for 100,000, or 500,000, or 1,000,000, or 3,000,000 cubic feet of gas per day? This is an easy question to answer, it requires no pen, pencil or paper to figure upon this, no intricate calculations are required. *Our scrubbers* are invariably constructed *for the utmost capacity of the main;* that is they have 25 per cent. more area than the main pipe, and whatever gas can be delivered to the scrubber through such main, is easily passed through it without the slightest difficulty under all circumstances. Having this advantage, it is ever ready for the maximum and minimum alike, this I know has not been so successfully arrived at or accomplished before. No change of climate will affect this scrubber: it is adapted to the rigors of winter and the heat of summer.

2nd. I have embraced the subject only as far as naphthaline is concerned. Ammonia is next to be considered. How is this removed? Why, by solution. Has it ever been removed by any other method, except that left for the purifiers to accomplish? Ammoniacal liquor is formed in the destructive distillation of the coal; in this way the water in combination with the coal is set free in the form of aqueous vepor, and this condensed has a very decided power in dissolving the ammonia, and as the contributions of water are being made constantly, there is no opportunity afforded of its becoming only of a given strength. Water 50° Fah. absorbs from 670 to 700 times its volume. But this would perhaps evolve, if the well known chemical actions of the carbonic and hydrosulphuric acids were not constantly taking place. The gas being plunged down in and through the liquids, cannot pass it without leaving nearly all of this substance in solution. There is a portion of the moisture that passes beyond the boxes; and here the lattice work and corrugated plates in the upright pipes play their part. It is upon them, as I have seen, that the moisture appears in clear drops of water, sparkling as dew upon the leaf of the plant. This holds a portion of the ammonia and runs down the plates, falling and mingling with the liquids in the main box, and is then carried out at the outlet pipe to the wells.

3rd. The chemical action thus most assuredly takes place, for the elevation of temperature at the first box proves this conclusively. This changes the character of the ammoniacal products; also at the same time the gas is freed from a portion of its sulphur products as the purifiers proves, they purifying more cubic feet of gas per bushel of material used then any other known psocess. It can challenge the same degree of purity at the outlet of the scrubber, for I have seen pieces of white cloth not soiled in the least by letting the gas escape through a ¾ inch pipe upon it at the outlet of the scrubber.

Again, the effect of this method on the quality and quantity of the gas.

The washing of gas with water otherwise than that combined with the coal, all know has a very deterior ating effect upon quality.

Being a powerful solvent it attacks with avidity the light hydrocarbons; they are brought down with it and do not rise again.

The question may be asked, if you leave them in the gas will they condense at other points? This cannot be if the principle is complied with to the letter; that is, make the gas of a given quality so that it absorb them, and they positively will not condense at other points. In order to prove this I have tried it many times upon a number of the gas products made and distributed.

Some of the experiments were tried in presence of gentlemen whose talent and veracity is far above reflection. I have caused the gas that was experimented upon as it was furnished from the street mains to freeze out, or the pipes that conducted it to refuse to furnish, by passing it through a coil of ⅜ lead pipe (77 feet long). Said coil being placed in a tub filled with ice and salt, and one hour and thirty minutes was quite sufficient to determine that at a temperature of 3° below zero it would not burn any longer. This can be done every day with gas that has been subjected to the ordinary washing; I have tried it a score of times. Perhaps I may be slow in believing, and I offer this as my reason for testing so many times. Now, I do know that gas taken from the same main at the same time, and passed through a coil of lead pipe ⅜ of an inch of greater length by several feet, and ice frozen in the same latitude, salt from the same sack, and thermometer in each tub, alike as near as possible the same degree of temperatute, continued to burn all night; simply because the gas absorbed a small percentage of the coal oils which were obtained from the tar wells where ordinary washing is employed. The question would then seem to arise—Why is this? or, How is it? This is contrary to accepted theories.

I give it as my opinion, guided by careful observations made, that in the first case the internal surface of the coil of lead pipe presents some slight projections at some point, and it is upon these projections the condensation first appears and collects.

It is then frozen, and particle after particle as they course their way are intercepted and are continually adhering to each other until the work is complete; that is, a substance similar to a cob-web is formed across the diameter of the pipe, when its passage is finally closed or stopped, and the gas ceases to burn.

On the other hand, these oils are absorbed in natural quantities; not being incorporated by heat they only exist in proportion as the gas has power to hold and carry them. For it is these substances that act as a lubricator and oil the machine that is grinding and jumping, giving the gas its full strength and power to burn.

Carburetters that are located near a heater will cause an unusual quantity of benzole to go forward, and I have seen it flow out at the burner; when it is removed to some cool place this feature disappears. This is plain enough, and it proves to me that gas made from pure naphtha alone will condense or resolve itself into a liquid again, not because it cannot be made a fixed and permanent gas, but more from this reason, that experimenters and engineers have always been in so much of a hurry, as to transform it suddenly and get rid of it as quickly as possible. I have tried this experiment with naphtha, and found that if it is subjected longer to the action of the heat, it is a more fixed and permanent gas; besides its specific gravity is less.

I did not intend to have so much to say upon what might be considered as matter foreign to the subject, but as there is so much difference of opinion and doubt expressed upon this scrubber—that there is nothing in it—or, what is the use of leaving the richest part of the gas in, as it will condense.

It is upon these points that I wish to be understood.

I am yet to be convinced that condensation is properly applicable to this branch of industry.

It most positively does not apply to tar, for that is removed by cohesion—neither does it apply to ammonia and naphthaline, for they are removed by solution and the purifiers. Whatever aqueous vapor or moisture there is in the gas (held in suspension) will condense, and the condensers in general use have failed to take all of this out.

In fact the scrubber at the Harlem Gas Works, small as it is, shows much less condensation than the long range of 16 inch pipes and the two large scrubbers formerly employed.

I have this from John Balmore, Esq., the engineer, who tells me that the syphons on the street mains prove it, as there is less water etc., etc., than formerly, with their 800 feet of upright pipes, anp two seven feet cylinder scrubbers, with a one inch stream of water in each, playing constantly upon the whole volume of gas.

I do not propose to say much about the methods employed, such as the condenser and scrubber referred to, and if I should simply allude to the multitubulars, it will be with the goeatest respect.

Their principle, no doubt, is much better, and an improvement upon those already referred to; but, if I understand them, they are trken from the tubular boiler, and they—the boilers—are certainly a very great improvement upon the old style of return flue; simply because they present so much surface for the action of the heat, which more readily converts the water into steam.

This principle seems to be consistent in itself. But as I do not admit the term of condensation to hydrogen gas, *I am fully convinced that the multitubular condenser is a better machine incomplete than it is complete.*

It is when the tubes are surrounded with cold water that they do not extract as much tar, but when there is no water surrounding the heat is radiated from one tube to another, and when they become of the same temperature as the volume of gas, they arrest more tar, it is more pliable and yielding, and upon this I challenge refutation.

I have many facts about this word condensation, and, if its meaning has not been changed since I attended school, it means the act of reducing to the conditions of a liquid or solid; or as the condensation of vapor into rain, aqueous of course, such as is held in suspension in all gases made from coal. But, does hydrogen gas condense, *i. e.*, is it reduced to a liquid? I think not. Let us see. Miller's "Chemical Physics," p. 291—Faraday states as the result of his experiments: Six gases—oxygen, hydrogen, nitrogen, nitric oxide, carbonic oxide and marsh-gas have resisted all attempts to liquefy them. Faraday found

that oxygen remained gaseous under a pressure of of 27 atmospheres, at a temperature of 166°; and at a pressure of 58·5—at 40°—was equally ineffectual in producing its liquefaction. Nitrogen and nitric oxide resisted a pressure of 50 atmospheres; with carbonic oxide, a pressure equivalent to that of 40 atmospheres; with coal gas, one of 32; and with hydrogen one of 27 atmospheres was applied witoout effecting the liquefaction. In all these experiments the temperature was maintained at 166°. Andrews has succeeded in applying to these gases still stronger pressure than any recorded by Faraday, without producing liquefaction, although a bath of ether and carbonic acid was employed; air was reduced to .675 of its bulk, oxygen to .554, hydrogen to .500, carbonic oxide to .278, and nitric oxide to .680 of its original volume.

Hydrogen and carbonic oxide departed less from Marriott's law than oxygen and nitric oxide.

As I am fully convinced by experience and experiments made, that condensation has nothing to do with well-manufactured gas:—

I now pass on to the actual increase of both quantity and quality. I have tested this many times, and find that by test meters I could not improve it, quality without increasing its quantity.

Why was this? I reversed the meters and the same story was told. This was accomplished in the presence of gentlemen who made the attachments and calculations themselves, and their conclusions were positively errived at, that we could not increase one well without improving the other—specific gravity remaining the same. The gas was passed into the first meter by a tube, and all atmosphere expelled completely from all the apparatus employed to the burner, which was lighted, and the gas burning, so that we could be positive. Then this principle was applied, and in consuming four feet of gas, the increase of quantity was actually determined.

The meters were reversed many times and invariably the same result was obtained. It was not because I say so, but because the meters conveyed this to me, and if their story was a fabrication they must have had some supernatural power invoked to their aid.

Now, what has this to do with the scrubber? It is this—that fortunately for it that oils will occupy the upper strata, and benzole and naphtha are always present in the liquids coming from the hydraulic main, and it is by the gas absorbing them that eome of the great advantages are secured.

In conclusion, what is claimed and guaranteed

It is claimed that gas can be made from ordinary coals, such as Murphy Run, Caledonia, and Westmoreland, of a quality ranging from 17 to 18 candle-power, and as per Dr. Chandler's report, nearly 11,000 cubic feet from Murphy Run and Penn coal, without any enriching material whatsoever, such as Cannel coal, Ritchie mineral, naphtha, etc,, etc.

These are the results that have been actually obtained at the Harlem Gas Works during the past year, and I have not the slightest hesitation to guarantee much better results from the improved scrubber, as shown in the foregoing cut. I have attempted to make as clear as possible the absolute working of this scrubber, which is the result of long experience and careful study, and my conclusions are, that it is constructed upon principles and governed or controlled by three inviolate laws of nature.

1st. Tar is removable by cohesion.

2nd. Ammonia and naphthaline by solution.

3rd. Ammonia fixed by the carbonic and hydro sulphuric acids existing.

In fact, employing the liquid products of the coal for the purification of its vapor.

W. H. St. John,
No. 207 East 52nd Street, N. Y.

Captain Byron S. Heath, of Chester, Ohio, died last September from the effects of the rarefied atmosphere at the summit of the Oroya Railroad, Peru. He was one of the Goverment engineers of Peru.

Chemical Repertory.

No. 126.—February 2, 1875.

EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

1335. Petroleum Export in 1874.—The exports of petroleum from all parts of the United States last year up to December 11th amounted in crude equivalent, not including naphtha, to 6,999,996 barrels, as against 7,122,444 barrels in 1873. The average per day of exports to the 11th was 20,231 barrels, 1873, same time the average was 20,585 barrels.—*Exch.*

1336. Lamp of Sulphide of Carbon and Nitric Oxide.—Delachonal and Mermet.—If binoxide of nitrogen is kindled in a flask containing the vapor of sulphide of carbon a dazzling light is produced, which immediately causes the mixture of hydrogen and chlorine to detonate. The violet-blue tint of the light proves its richness in the chemical rays. The authors give a description of the lamp, and of experiments made with its light, which proves to be well adapted for photographic purposes. The spectrum of the light is very analogous to that of sulphur.—*Chemical News.*

1337. Is This Thus?—An exchange says that "it is designed to supersede in London the office of the lamplighter by a kind ot clockwork arrangement attached to the taps of the street lamps, which shall turn them full on at stated times, every night, and shut them nearly off every morning, the gas being kept constantly burning during the day with a very small blue flame, duly protected against extinction by the wind."

1338. Closing Cracks in Cast Iron Stoves.—Good wood ashes are to be sifted through a fine sieve, to which is to be added the same quantity of clay finely pulverized, together with a little salt. The mixture is to be moistened with water enough to make a paste, and the crack of the stove filled with it. The cement does not peel off or break away, and assumes an extreme degree of hardness after being heated. The stove must be cool when the application is made, The same substance may be used in setting the plates of a stove, or in fitting stove pipes, serving to render all the joints perfectly tight.—*Scientific American.*

1339. Chemical Custodians.—In the American news, *via* England, we find (in *Iron*) that in this country brick vaults and safes are now advertised which are so adjusted that any attempt to reach the interior of the safe by violence would necessarily break sundry bottles filled with sulphuric acid into powdered carbonate of lime. The instantaneous production of carbonic acid gas would be enough to asphyxiate a regiment. The inventive genius of burglars will now be severely tested to find some means of protection from this novel method of defence.

1340. Electric Gas-Lighting.—We have a report that Salem, Mass., has made arrangements to light street lamps simultaneously by electricity, and in the *Bulletin de la Societe d'Encouragement*, October, 1874, report on lighting the gas in the Hall of the National Assembly at Versailles by Lissajous. The burners are lighted by electricity. A Ruhmkorff coil of medium size, with an automatic mercurial interrupter, is set in action by a Leclanche battery of four elements, the zincs having a surface of a square decimetre. These are only equivalent to three Bunsen elements of a middle size, but their duration is much greater. Under the influence of this battery the coil gives sparks of 15 centimetres. To transmit the electricity to the different lustres a special wire is employed for each, but the return current passes through one common wire.

1341. The Stone-Pavement Trade.—A New Jersey paper tells us of the quarries along the Palisades: The trap block makers have discontinued quarrying, the cause being the complete stagnation of the demand for blocks at prices warranting a profit. Prior to the election they were receiving $20 per 1000, and the demand now is at $15 per 1000. The highest figure ever gained was $45. Taking into consideration the cost of drilling, blasting, breaking and chipping, and the fact that twelve days work are necessary to the making of one thousand blocks, or about 73 per day, it will readily be seen that their action in the matter is correct.

1342. British Minerals in 1873.—The keeper o Mining Records, Robert Hunt, F.R S., has reported on the production of 1873. We take a few figures:

	Tons.	Values.
Coal	127,016,747	£47,631,286
Iron Ore	15,577,499	7,573,676
Pig Iron	6,566.451	18,329,766
Clays, Fire and other.	1,785,000	656,300

The number of collieries is stated to be 3,527, and the men and boys employed 514,150. Deaths during the year 1069, or only one life given for a hundred and twenty thousand tons of coal.

1343. British Patent.—Purification of gas and gas liquor. F. C. Hills, manufacturing chemist, 14th March, 1874.—Relates to a process described in patent No. 1560, and consists of certain improvements in purifying gas liquor and in using gas liquor for the purification of gas. The crude gas liquor is run either direct or through a scrubber to a still in which the said liquor is kept at a temperature of about 180°, whereby carbonic acid, sulphuretted hydrogen, and ammonia are driven off. These products pass from the still up through the said scrubber; the greater part of the ammonia being condensed and carried back to the still, in the descending gas-liquor when the said liquor is passed through the scrubber, while the sulphuretted hydrogen and carbonic acid gases escape at the upper part of the scrubber with a little ammonia, which latter may be taken up by water, acid, or other suitable agent. The carbcnic acid and sulphuretted hydrogen may be passed through oxide of iron to collect the sulphur. The crude gas-liquor before being run into the still may be kept for some time at a temperature of about from 160° to 170°, and the sulphuretted hydrogen then given off may be used for making sulphate of ammonia. The gas liquor treated as described, may be used for purifying gas. Crude gas-liquor is made to combine with more of the carbonic acid combined with gas, and thus to free the said gas from such acid by passing such gas direct from the hydraulic main at a temperature of 160° into a scrubber.

1344. Water Mains in Cities —The London *Journal of Gas-Lighting* tells us that the total number of miles of water mains in the metropolis, belonging to all the companies is 2.580. The total numbor of miles of streess with mains constantly charged is 665½. The total number of hydrants erected is 2,526. The total number of houses supplied during the month of October last was 512,946, and of this number 59,228 were on constant service. The average daily quantity of water supplied was 116,386,836 gallons, of which 16·8 per cent. is estimated to have been delivered for other than domestic purposes. The population supplied within the districts of the water companies is taken at 3,683,888. As compared with the first of these figures, we may note that New York has now 400 miles of water-pipes; Chicago, 350 miles; Brooklyn, 200 miles; Boston, 350 miles; Baltimore, 200 miles; Detroit, 170 miles; St. Louis, 150 miles; Louisville, 75 miles; Cleveland, 70 miles, and Milwaukie, 40 miles. Engineer Culver, of Jersey City, makes the length of mains in that city over a hundred miles.

1345. The McKean County Coal.—Of this extreme northern Pennsylvania coal-field, which we have repeatedly referred to, we learn that the Buffalo

Coal Company, whose lands are located in McKean county, expect to have their branch road completed early next season; it will extend 23 miles from Larrabee Station on the P. N. Y. and B. read. The company have run three drifts into their mining property, and find the yield to be much greater than they could have anticipated. They have also made tests remote from the openings by means of their diamond drills, and find the veins much thicker than had been calculated upon. The company have a large force of men employed in and about the mines, and by the time named for the completion of the road they will be prepared to supply the Buffalo market with from 500 to 1,000 tons of coal daily. They own 16,000 acres of selected coal and iron lands.

1346. Pollution of New Jersey Rivers.—The New Jersey Legislature passed last winter an Act containing the following clause:

Be it enacted, That it shall not be lawful for any person or persons to place in any of the ponds, lakes, rivers, or streams of this State, or in any of the waters belonging to this State, any lime, gas-tar, cocculus indicus (otherwise known as fish berries), or any other deleterious substance, or take or catch fish with any deleterious substances or medicated bait, nor shall any person or persons make use of giant or electric powder, or any explosive substance whatever for the purpose of taking fish, and any person or persons offending against the provisions of this section of this act, shall be guilty of a misdemeanor, and upon conviction shall be punished by imprisonment for a period not less than six months or more than two years, or by a fine not less than two hundred dollars nor more than five hundred dollars, or by both such fine and imprisonment, at the discretion of the court before which such conviction shall be had.

1347. "Residuals" in England.—The accounts of the Phœnix Company afforded the chairman the opportunity of explaining once more that the profits, as they stand, are made out of residuals. These have produced in the half year £38.483, and the net profit is £34,812 The sum required for dividend is £38.025, hence a draw has to be made on the reserve-fund to the extent of £3,213. If this be the result of a half year's working at 4s. 6d. per 1000, it may be confidently anticipated the current half year at 4s. 2d. will be more unfavorable. It is impossible to criticise the accounts of the company as presented in these half-yearly returns, and we must pass them over until we get the yearly return supplied to the Board of Trade. —*London Journal of Gas-Lighting.*

1348. Dubious, but Worth Examination.—Somebody has started a story in the newspapers that when oxide of iron is placed in contact with timber, excluded from the atmosphere, and aided by a slightly increrased temperature, the oxide parts with its oxygen, and is converted into very finely divided particles of metallic iron, having such an affinity for oxygen that, when afterwards exposed to the action of the atmosphere from any cause, the gas is absorbed so rapidlo that these particles becomes rapidly red hot, and, if in sufficient quantity, will produce a temperature far beyond the ignitable point of any timber. Whenever, therefore, iron pipes are employed for the circulation of hot water, air or stoam, and when in close contact with timber are allowed to become rusty, it is only necessary to suppose that under these circumstances the finely divided particles of metallic iron becomes exposed to the action of the atmosphere, in order to account for many of the fires which take place at the commencement of the winter season.

1349. New Method of Filtration.—Prof. Charles A. Seeley has invented a new method of filtration. At the bottom of an open glass tube, say one inch in diameter, he places a piece of filtering paper, and over this a piece of India muslin, which is secured around the tube by a rubber ring. The tube is filled with the liquid to be filtered, and is closed at the top with a rubber stopper through which runs a piece of rubber piping. The tube is connected with two bottles, so arranged that the water in the upper one flows down into the lower one, forcing out the air, which in turn runs through the rubber pipe, forcing out the liquid through the filtering material. The arrangement is exceedingly ingenious, and by this means a liquid may be filtered in one-fourth of the time which the operation takes up by the old method.

1350. New Use for Gas, in France.—Charring timber is an excellent mode of preservation, and Lapparant has an apparatus for this object by the use of gas. The results obtained from experiments at the gasometer at Cherbourg, with the aid of a meter, and using a jet of average force, were: 1st. Consumption of gas about 200 litres per square meter, at 200 gallons per 10 square feet of carbonized surface. 2nd. Workmen's average day's work of ten hours would carbonize 440 square feet. 3rd. One workman is sufficient for bellows supplying two jets of gas. At full work the expense would not exceed 1½d. per ten square feet. The operation can be facilitated by smearing, in the first instance, the surface of the timber with a little tar, and with the following advantages: 1st. The carbonization of the cracks is facilitated. 2nd. It prevents the timber being too suddenly affected by the heat of the gas, which causes it to split. 3rd. It prevents the cracking and splintering off of little ignited particles.—*Building News.*

Gas-Lighting on Railways.

[From "The Engineer."

Possibly the most imperfect detail in our railway system is the method adopted of lighting the carriages. We do not allude to the windows, although there is plenty of room for improvement even as regards these, but to the provision of artificial light for night travelling. Apparently there is no reason why a railway carriage should not be as well lit as a drawing room. The space to be lighted is small, and the expense must in any case be very little as compared with other items essential to railway transit. But as a matter of fact, even on the best managed railways, the light supplied by the regulation lamp is simply wretched. To read at night is impossible, and the utmost that has been effected is to render darkness visible by the use of a heavy, lumbering, evil-smelling appliance, the cost of which is by no means small, while the waste of material in the shape of oil and wicks which attends its use is absurdly great. The public complain loudly and reasonably. But there is little cause to doubt that the railway companies are perfectly aware of the disadvantages of the existing system—directors constantly travel by rail—and it is not to be disputed that many attempts have been made to provide better lighting apparatus than that with which we are all but too familiar. Many difficulties have stood in the way, however. The great defect of the existing lamp is that oil to be burned properly requires a chimney; but it has been found impossible to use argand lamps in railway carriages. They are exposed to incessant draughts, and the chimneys break continually; and the labor entailed besides, even if the chimneys stood, in keeping them clean, would be inimical to the adoption of the forced draught system of combustion. It does not appear, indeed, that so long as oil is to be used for illumination, anything much better than the existing lamp, or more satisfactory in handling, can be adopted. The obvious way out of the difficulty lies in using gas. How far this is a satisfactory remedy any one in the habit of travelling on our metropolitan railways can judge. The gas is carried under the ordinary pressure in bags on the top of the carriages, and for short runs say four or five miles, the plan answers tolerably well; but air is apt to get in with the gas, and a very small admixture of air will remove a large proportion of the lighting power of the flame. It has been proved that 5 per cent. of air mixed with gas will reduce 16-candle to little over 10-candle power, and this defect is very apparent on the Metropolitan railway; and besides the light is not so steady as could be desired. Imperfect as the application of gas to lighting railway carriages still is as a system, it is still certain that it gives results much better than oil as regards the comfort of passengers. But unfortunately coal gas cannot be used for long runs. To carry a reservoir or gasholder large enough to last for a run to Holyhead from Euston, for example, would be impossible. A large vehicle would be required to convey the gasholder alone, Many attempts have been made therefore to use gas under pressure, so that a large number of cubic feet may be stored in a small space, but hitherto these attempts have all proved abortive, because coal-gas when compressed appears to deposit carbon, and loses nearly all its lighting powers; and, in addition, it is found to be very difficult to keep coal gas at all under pressure, as it leaks slowly through vessels which would be quite air-tight. There is a way out of the trouble, however, and experiments now being tried on the London and North-Western Railway, to which we wish to call attention, have given results so satisfactory that there is reason to hope that gas will supersede oil on our railways as effectually as it has been done in our dwelling-houses.

Herr Julius Pintsch, of Berlin, has long been known on the Continent, as a maker on a great scale of gas meters and gas-fittings. As far back as 1867 he placed himself in communication with the officials of the Niederschlesisch-Markische Railways, and proposed a new system of lighting railway carriages with gas. They co-operated cordially with him, and after more than three years of experimenting all difficulties were overcome, and the Pintsch system of lighting has been adopted regularly on the railway in question, and is being rapidly applied on eight other lines, including that from St. Petersburg to Moscow, and the Austrian "Nord-Kaiser Ferdinand." The system consists in fitting each carriage with a reservoir of wrought iron, into which gas is forced to a pressure of about six atmospheres, or 90 lbs. The gas then flows from this reservoir through a very simple and ingenious regulator to a lamp made of cast iron and of the simplest possible construction, which is placed in the roof of each compartment in the ordinary way. Now all attempts to use coal gas in this way have been failures, for the reasons already explained; but Herr Pintsch employs oil gas, which is quite unaffected by the pressure when made as he makes it The oil-making apparatus consists of a double-story retort. The oil, which may be whale oil, dead oil, common blue shale oil, coarse petroleum, fat—in fact, almost any cheap hydrocarbon will do—is introduced in a continuous stream into a tray in the upper retort. Here it becomes partially volatilized, and then circulating through the lower retort the pr cess is complete, and the gas is passed through a short length of pipe provided with a tar-well, and thence to a purifier charged with sawdust and lime, and thence to a gasholder. On the Niederschlesisch-Markische Railway the cylindrical portions of two old locomotive boilers with flat ends riveted in, are used to hold the gas, which is pumped in by a small compressing engine operating not on the gas directly, but on oil which rises and falls with the pistons in a way which will be readily understood. The gas is pumped into these at a pressure of 90 lbs. At the side of a convenient piece of rail several small stand-pipes are erected, which are in communication with the compressed gas reservoirs, and from these, by the aid of a stout india-rubber hose and coupling, the reservoirs under the carriages are filled much as the bags are filled on the Metropolitan Railway. About eight minutes are required to supply a long train with gas. The gas is led to the lamps on the roofs by small pipes one-quarter inch bore, and the fittings are so contrived that the burner, which is of the batswing type of steatite, is readily turned back out of the basin of the lamp to permit the lamp to be cleaned. The glass bowls can be replaced, if broken, in a few minutes. A reflector is placed over each flame, and through this reflector passes a flat chimney. the air for combustion comes down outside this chimney, finding its way in through small perforations and at the highest speeds no flickering of the flame i

perceptible. This lamp is in itself worth the attention of railway companies, even if it were to be used with oil, as it possesses many advantages over the ordinary lumbering contrivance. Before the gas reaches the lamp, however, it has to pass through the regulator, and this is one of the essential features of the whole design. It consists of a small cast-iron box placed under each carriage out of the way. This vessel is divided into two portions by a diaphragm of dressed sheepskin, which is partially supported by a small lever and spring. The lever acts on a little conical valve, and the moment the pressure becomes too much the diaphragm rises and shuts off the gas. We have seen this regulator tested, and its action, we can say from personal observation, is perfect; and it is found that the gas improves the quality of the leather, being, as it is, free from acids and rather oily in its nature. It is unnecessary here, we think, to enter into farther descriptive details.

As regards the results, it will be asked, first, for how many hours can gas be carried? And, secondly, what is the light given? As regards the first point, we may state that a composite carriage has been fitted up on the London and North-Western Railway. This carriage has been running for some weeks. It carries gas enough in a receiver made of wrought iron, three eighths of an inch thick, 5 feet 10 in. long, and 1 foot 4½ in. diameter, at five atmospheres pressure, to run twice to Holyhead and back, sufficient gas being left for a farther run to Chester, if necessary. In other words the carriage carries gas for over 1,000 miles. It may be imagined that the gas would waste away, or lose its illuminating power during so long a run, but this is not the case. We found the carriage after two runs to Holyhead and back, and having stood at Euston three days, still carrying a pressure of one atmosphere, as tested by a Bourdon gauge, put on for the purpose of ascertaining the pressure. But the point has been set at rest by Herr Gust, of the Niederschlesisch Markische Railway, who filled a receiver, and left it untouched for eight months, at the end of which time it was found to contain gas under a considerable pressure, and of good illuminating power. The apparatus in use at Euston for making the gas is temporary and of the rudest description; two pieces of 3-inch wrought iron piping about 4 feet long constitute the retorts, which are heated by coke burned in a sheet iron furnace. The purifier is about as big as a hat, and the gasholder was made by a tinsmith; the oil used is that drained from the carriage-lamp bowls, and is, we need not say, sufficiently filthy stuff; the pumping is done by a couple of men. As regards the second question to which we have referred, we may state that the oil gas is probably of nearly 40-candle power, and the light in the carriage is about 7 to 4 in favor of the gas.

We have spoken thus fully of Herr Pintsch's system, because it appears to have been well and carefully thought out. The labor involved is partly proved by the enormous number of patents which have been taken out from time to time to cover improvements. The use of this system on the Continent is an accomplished fact, and the results obtained on the London and North-Western Railway really appear to leave nothing to be desired but its more extended adoption. Of course, it is quite possible that better systems of lighting may be used, but we venture to think they have to be yet invented. We have said nothing about relative cost, that is a matter of detail little affecting the public, and not possessing scientific interest enough for discussion here; we believe, however, that the expense of the light is found on the Continent to be about 70 per cent. cheaper than oil-lamps.

Preventing Smoke.

In the address lately delivered before the British Association, by Prof. Jas. Thomson, C. E., LL.D., we find the following:

The atmosphere of our large towns, where people live by hundreds of thousands all the year round, is not yet guarded against needless pollution by smoke jealously, as it ought to be. Many of the wealthier inhabitants take refuge in living in the country, or in the suburbs of the town, as far away as they can from the most densely built and most smoky districts; but the great masses of the people, including many of all ranks, must live near their work, and for them at least greater exertions are due than have yet been made toward maintaining and improving the salubrity and the amenities of our towns. As to the abatement or prevention of smoke from the furnaces of steam engines, the main requisites have long been very well known; but sufficient energy and determination have not yet been manifested toward securing their due application in practice. In too many cases futile plans have been tried, and on being soon abandoned, have left a strong impression against the trying of more experiments; and this may account in part for the introduction of real improvements having been so slow. Smoke occurs when fresh coal is thrown suddenly, in too large a quantity at once, on a hot fire. By extreme care a fireman may throw coal into his furnace so gradually as to make very little smoke; but mechanical arrangements for introducing constantly and uniformly the new supply of fresh coal have been devised, and several of these have been such as to reduce the smoke emitted to almost nothing. I have seen in the neighborhood of Glasgow, at a large manufacturing establishment at Thornliebank, one method which is applied to about thirty ordinary 40-horse power boilers, in which upward of 100 tons of coal are daily burned, and from the chimneys of which not more smoke is emitted than from many a kitchen fire. This method is under the patent of Messrs. Vicars, of Liverpool, and it seems to work very well. It has been about two years in work there. It was introduced at a time when coal was exceedingly high in price, as much to effect economy in fuel as to prevent smoke; and although the first cost was somewhere about £130 per boiler, the proprietor considers himself to be already more than recouped for his outlay, as a saving of fully 12 per cent. in the fuel consumed was effected. At the same works I have also seen in operation the method of Messrs. Haworth & Hosfall, of Todmorden, which has, I am told, in certain circumstances, some advantages over the other. In this, as in the other, the coal is fed in uniformly by mechanical arrangements. The mechanism is different in the two cases, but the result in the motion communicated to the coals is very much alike in both. The bed of coal, which is gradually supplied in front, is caused to travel along the bars towards the inner end of the furnace, and the combustion proceeds in a very uniform manner in conditions highly favorable to economy of fuel, and without the emission of almost any visible smoke.

These two methods I have mentioned because they appear both to work very successfully in practice, while they both bring into effect the principle of action of the fuel which has long appeared to me to be the best that can be adopted for ordinary cases of steam engine boilers.

The Government of London.

The project for extending the Municipal Government of the square mile which comprises the city of London over the 150 square miles that are contained in the metropolitan district, begins to attract attention and discussion. The draft of the bill for the accomplishment of this change has been printed, and it will be laid before Parliament early next session. London—that is, the vast collection of cities that goes by that name—has a population equal to the whole of Scotland. It contains almost as many people as live in the State of New York. Its wealth is far greater than that of all the dominions of Queen Elizabeth. This vast province has scarcely any government whatever. The city proper is ruled by the companies, the other portions of the metropolis are only vast parishes, governed by parish vestries. There are many reasons to believe that if a proper system of centralized municipal government were invented and put in operation for this vast province, decided advantages might follow; but at the same time one can but feel some dread at the thought of what might happen if, when such a government had been established, it should fall into the hands of a "ring." "Rings" are not unknown here. The fear of such a calamity has caused the plan for the new government to be scrutinized with great care. One of the amendments already proposed to it is that, while the Lord Mayor and Common Council may be elected by the rate-payers, the Judges of the Courts, the Superintendent of the Police, the Treasurer, and some of its other officers should not be elective, but be appointed by the Crown, holding their offices for life or during good behavior. The suggestion is apparently a wise one. "Responsibility to the people" is a very good thing; but "the people"—or a large share of them have often had cause to wish that their servants were independent of popular clamor.—*N. Y. World Correspondence from London.*

Five Years' Oil Statistics.

We give below the number of wells drilling, and the daily average production for each month from 1869 to 1873, inclusive. It will be seen that only sixty wells were drilling in December 1873, less than one half the number at any previous time during the five years given:

NUMBER OF WELLS DRILLING.

	1869.	1870.	1871.	1872.	1873.
Jan.....	378	364	167	339	261
Feb.....	341	388	173	335	219
March.....	334	395	176	298	227
April.....	292	432	254	277	227
May.....	312	441	295	293	228
June.....	345	463	296	298	295
July.....	305	349	316	315	340
August.....	310	319	342	330	267
September	315	306	438	264	197
October....	331	365	470	shut down	163
November	360	206	459	355	137
December.	346	191	388	333	60

DAILY AVERAGE PRODUCTION—NO. OF BARRELS.

	1869.	1870.	1871.	1872.	1873.
Jan.....	10,102	12,634	14,690	17,070	20,407
Feb.....	9,967	11,917	13,740	17,308	21,725
March.	9,891	12,385	14,118	16,924	21,461
April...	11,067	12,974	14,187	16,626	21,384
May....	10,153	14,165	15,218	18,565	25,044
June....	11,334	14,817	15,699	17,982	26,449
July....	11,6?7	16,969	16,898	18,349	27,893
August.	12,157	17,777	17,678	18,792	30,198
Sept....	12,645	19,489	16,753	15,863	31,809
Oct.....	13,07I	20,158	16s741	.....	30,403
Nov....	13,317	17,414	16,862	21,287	33,045
Dec.....	12,844	16,431	16,531	20,824	34,980

—*U. S. R. R. and Mining Register.*

American Fuel-Blocks.—The "Loiseau Pressed Fuel Company" has been formally launched with prominent coal men in the directorate, the Hon. John Leisenring as president, and Fisher Hazard, secretary. Buildings and machinery were commenced at Port Richmond, and the new fuel was promised for the market this month. The processes consists in the addition to the coal waste of 5 per cent. of clay, the mass being moistened with a solution of lime in water. This mixture is fed to the hopper of a machine provided with compressing rolls containing cavities which are egg shaped and in which the lumps of compressed fuel are formed. The machines for use on a large scale will contain rolls three feet long with a total capacity of 100 tons per day. Although the fuel is ready for use on leaving the machine, and will not disintegrate in the fire or in handling, the inventor further treats it with a mixture of benzine and stearine, making it water-proof, and capable of exposure to the weather for any time. This feature of the process is not employed in Europe, where the manufacture of artificial fuel has been conducted for some years with success. If, as seems probable, Mr. Loisean has perfected his process, the profit before him and the advantage to the country in the utilization of coal slack are enormous. The company includes several of our shrewdest business men, who propose to put the patent fuel on the market at $1 per ton below the price of coal in lump.—*Iron Age.*

Carburetted Air.

In introducing a machine for grinding out this sort of apology for gas, the *British Trade Journal* indulges in the following remarks, which, taken by themselves, seem true enough and suggestive enough in the main to merit space:

The manufacture of illuminating gas from petroleum has for many years received much attention both from scientists and inventors, more especially in the United States; but it has been only since the late enormous rise in the price of coal and the consequent alarm lest there should be a corresponding increase in the price of gas that the subject has received much attention in this country.

The enormous production of petroleum in America and the extremely high illuminating power of its gases, naturally suggested the enquiry whether under proper manipulation it might not afford a cheap and apparently inexhaustible substitute for coal as a gas-producing material. It need not be wondered at that such a field of enquiry should present tempting inducements to speculators and inventors, and accordingly we soon heard of a host of newly-patented inventions for the manufacture of gas from petroleum or its products. Smart promoters with everything to gain and nothing to lose undertook the task of manipulating these patents and organising stock companies to buy and work them. The companies were duly organised with complete corps of officers, showy offices were taken, flaming prospectuses were issued, the British public were invited to invest their spare cash in the purchase of stock, and on the faith of the reports of well known chemists and engineers were induced to do so.

How these reports were procured it is not our province to enquire, suffice it to know that, however procured, many of them were such as could not have stood the test of scientific investigation for a single instant, which accounts for the fact that the coal-gas companies, who, one would naturally suppose, were best informed upon such matters and would take most interest in them, kept carefully aloof, or stood idly by and with perfect indifference allowed outsiders to monopolise all the advantages of being able to produce and sell gas at prices so ruinously low that it would be impossible for themselves to compete with them.

Of the various kinds of gas produced or attempted to be produced from petroleum or its distillates, air-gas or gas composed of a mixture with air of the hydrocarbon vapors of the light distillates of petroleum appears to have received more than its share of attention from inventors, which may be accounted for by the apparent simplicity of the process, its peculiar adaptation to the production of gas upon a small scale, and the little practical skill its manufacture seemingly involves. Apparently nothing is more simple than to make air-gas. If air is forced through gasoline, one of the lightest products derived from the distillation of petroleum, or through some porous substance saturated with it, it becomes impregnated with the rich hydrocarbon vapors of the gasoline, which is extremely volatile, and may be conducted through pipes and burned like coal-gas. Nothing appears so simple or so easy as to make air-gas, and yet nothing involves nicer physical questions, or is so little understood. While the manufacture and supply of coal-gas employ enormous capital, and in consequence of their importance and extent can afford to subsidise first-rate engineering talent, so that the questions of production, cost, etc., have been closely studied out and tabulated, the subject of air-gas remains comparatively uninvestigated and unknown, the reason of which is apparently that the process appears capable of but very limited application and consequently does not seem to demand at the hands of scientists and experts the attention which it deserves, for it is admitted that while air-gas cannot enter into competition with that made from coal for lighting large towns, or cities, for small villages, isolated residences, churches, hotels, factories, etc., it possesses many advantages peculiar to itself.

When we consider the meagre and vague nature of what little reliable statistical information we possess upon the subject we are not surprised that energetic promoters of air-gas companies should put forward the most preposterous claims and make the most extravagant pretensions on the part of the several inventions they represent, nor are we surprised that they should find a speculative public ready to accept their extravagancies as facts upon no better evidence than the unsupported statements of chemists and experts, whose reports—to use a very gentle expression—frequently bear upon their face intrinsic evidence of error.

When, in the eagerness of speculation, capitalists are readily found to invest their money in projects which the crudest practical investigation would have proved to be commercial absurdities, we need not be surprised at having to record such experiences as the following:

On September 23, 1872, the Air Gas-Light Company (Limited) was incorporated with a capital of 200,000*l.*, divided into 40,000 shares of 5*l.* each. According to counsel, Mr. Dickenson, Q. C., the patentee, received either directly or indirectly, 100,000*l.* Extensive and costly experiments were made at the Crystal Palace and at various provincial towns. Eminent scientific men, who by the way were very careful not to become to become shareholders of the company, certified to the brilliancy and cheapness of the light produced by the new gas, for it was pretended that the company's process for the manufacture of illuminating gas from a mixture of hydrocarbon vapor and air was a new and wonderful invention. The most preposterous and contradictory statements were made. In some premises erected at Fulham it was endeavored to be shown that by the newly patented process 15-candle gas could be made for 10*d.* per 1000 cubic feet. Failing in this it was still stoutly maintained that the hydrocarbon vapor produced by one gallon of gasoline, costing 2*s.*, mixed with 800 cubic feet of air, would produce 1,000 cubic feet of 15-candle gas. The directors, who were at first quite enthusiastic, and looked upon their company as a new El Dorado, after a somewhat costly experience discovered that their gas was neither new nor cheap, and to avoid throwing good money after bad, applied to have the company wound up, when it appeared that out of 111,212*l.*, which had been paid in, the magnificent sum of 705*l.* remained to their credit at their bankers, in a word their whole available capital had disappeared. Now the slightest practical investigation of the claims put forward by this company would have shown them to be a clumsily woven tissue of scientific and commercial absurdities. Take for instance the statement that one gallon of gasoline would produce 1,000 cubic feet of 15 candle gas: One gallon of gasoline weighs 6·66 lbs. =46,620 grains, which, according to the statement of the promoters of the company, would produce 1,000 cubic feet=1,728,000 cubic inches of gas, which will give the formula—

$$\frac{46620 \times 100}{1728000} = \frac{4662}{1728} = 2{\cdot}07 \text{ grains}$$

of hydrocarbon vapor to 100 cubic inches of gas, and we were gravely asked to believe that this ridiculously small proportion of vapor would produce a 15-candle gas, when it is well-known that 100 cubic inches of 15-candle coal-gas contains about 11 grains of hydrocarbon compound.

Condensation, Etc.

From an address of John Pattinson, printed by *Iron*, we extract some interesting paragraphs:

Another novelty introduced in our district, which I think is deserving of the attention of our members, is the new form of condenser recently patented by Messrs. Newall and Bowman, of the Washington Chemical Works, and which these gentlemen have in use and are now experimenting with for the condensation of hydrochloric acid in their works at Washington. In this condenser condensation is effected by passing the acid gas through one or more stone cisterns, about six feet square and two feet deep, into each of which water is entering through a small orifice of about 0·06 of an inch diameter, under a pressure of about 40 lb. The fine stream of water is projected by this pressure with great force against a small disc, and is thus dashed into fine spray, which fills the whole of the vessel, and meeting with the hydrochloric acid gas, condenses it, forming liquid hydrochloric acid of the strength usually of 28 degrees of Twaddell's hydrometer. There is a considerable amount of heat developed by the condensation of the gas, and the vapor of water laden with hydrochloric acid after leaving the vessels in which the spray producers are placed is at present passed into a small condenser of the ordinary construction (much too small to do the whole work of condensation itself), where the vapor is cooled and perfectly condensed. In places where an ordinary condenser is not already in existence to be thus utilised it is proposed to place a series of cooling pipes between each spray-producer vessel in order to cool the vapor. I am glad to be able to say that Mr. Bowman intends to give the society a paper on the construction of this new condenser and the results obtained by its use.

It appears to me that these spray-producers may be used with great advantage in washing and purifying the smoke and gases from copper works, outlets of sulphuric acid chambers, manure works, and in many other cases where noxious vapors are sent into the air. With such an apparatus the draught of the chimney need not be interfered with, and what is of great importance for the effectual removal of condensable gases, every particle of the gases would be brought into contact with water. I would recommend that experiments in this direction should be made.

The spray producer may also probably be found of use in the purification of lighting gas as a substitute for the scrubber. An American engineer, Mr. B. E. Chollar, of St. Louis, patented, in 1872, an apparatus for this purpose, in which spray was produced by injecting water into a vessel through which the gas passed, by means of a jet of the gas under process of manufacture compressed to about 10 lbs. on the inch by a suitable compressor. More recently still, two French engineers, MM. Pelouze and Audouin, have patented a similar apparatus for the same purpose. Messrs. Newall and Bowman's water spray is, however, produced by much simpler means, and will probably be found to be as effective for this purpose.

Cooking by Gas.

At a meeting of the St. Pancras Guardian Board, a special committee appointed to consider and report upon the desirableness of cooking by gas at the Leavesden Schools, and also to investigate the merits of Skoine's patent for gas making, brought up their report, stating that they had met on three occasions, and given their best attention to the subject. They first proceeded to the London Hospital to inspect the gas-cooking apparatus in use there, which consisted of a well oven (Leoni's patent), a large kitchener, two small ovens, two larger ones, a steam chest for boiling without water. They then proceeded to the Poplar and Stepney Sick Asylum, where the same patent apparatus was in operation—viz., two large ovens and one stand for grilling. In order to ascertain if any improvement had been made since the erection of this apparatus, the committee invited the attendance of Mr. Leoni, the patentee, at St. Pancras Workhouse, and informed him of the requirements of the Leavesden Schools, and asked him to suggest the most suitable apparatus and approximate cost. The recommendation was as follows:

Roasting and baking–Two ovens in a large kitchen, costing about £180.—Roasting, baking, grilling and stewing—Kitchener in training kitchen, £24. Boiling–Steam chest in large kitchen, £55; making a total of £259. They had obtained a statement of the consumption of meat during the ninth week of the

last quarter, and the saving by adopting this system in the difference of waste alone would be £5 3s. 4d., equal to £260 per annum. The weight of meat on which this calculation was taken was 970 lbs. The committee, considering the results so fully verified by the disinterested testimony of the House Governor of the London Hospital, and the medical superintendent of the Poplar and Stepney Sick Asylum, recommended the erection of the apparatus suggested by Mr. Leoni, as it was certain that the outlay would be repaid by the reduction of waste alone in twelve months. The cost of fuel would be reduced. Irrespective of all saving of fuel, as the gas was manufactnred on the premises, additional advantages would be secured. They recommended that the same be approved by the guardians, and that, subject to the approval of the Local Government Board, the works be carried out as suggested, and further, in the event of obtaining the sanction of the Local Government Board to the proposed alteration and expenditnre, which must be done by Mr. Leoni, the patentee, they be requested to suspend the operation of articles 52, 53, and 54, in respect of advertising for sealed tenders, and that the committee, upon the receipt of the sanction of the Local Government Board, be empowered to carry out the whole of the said works. On the motion to adopt the report, objection was taken by several of the guardians to the outlay of so large a sum of money as was asked for by the committee, and it was contended that if cooking by gas was adopted, the girls in the school could not be trained to cook for other persons who used coals for the purpose. Eventually an amendment was proposed and carried to adjourn the further consideration of the question for three months.

Bituminous Coal Matters.

The coal operators of Cleveland, Massillon, Fulton, and their vicinity in Ohio, have agreed that a reduction of twenty cents per ton in the cost of mining is necessary. No fear of a strike is felt. The reduction is to be fully decided upon and put in operation at the beginning of the new year.

THE leading coal operators of the Upper Lehigh, Hazelton, Wyoming, and adjacent coal-fields are debating the wages basis for 1875. The general opinion is that the price of coal must be reduced to the consumer at least 50 cents per ton during the ensuing year. The difficulty seems to be in determining where the reduction is to be made. Three ways are open:

Lessening of profits to operators, reduction of wages, or less cost of transportation.

The miners declare they will resist the second, the operators say the first is impossible, and the last seems to be out of their reach as well as that of the consumers. Most of the collieries are closed or working on half time; the Pennsylvania Coal Company, however, continues full time. The number to be affected is about fifteen thousand; before the matter ends 30,000 men will be involved.

A CONVENTION of Pennsylvania bituminous coal miners met at Pittsburgh, Pa., on the 27th ultimo, on the call of President Siney, of the Miners National Union. The object of the convention, which was composed of delegates from several localities, was to consider the form and requirements of a mining law, to be submitted to a commission appointed some months since by Governor Hartranft, which has been investigating the subject. Their report is ready for legislative consideration. Mr. Siney says he has no doubt that it is favorable to the passage of a proper statute. Proper steps were taken by appointment of a committee to draft such a bill. An attempt is being made in the Tuscarawas Valley to settle a trades dispute over a reduction of wages by a conference between the coal operators and miners. Both interests are fully represented at the conference which is still in progress. Six delegates from each side are present. The reduction proposed is 20 cents per ton, and the proposal to arbitrate came from the men, through President Siney, of the National Union, who, with the Vice-Presidents of the national and State unions, represent in part the miners.

Mayor Wickham on the New York Pavements.

From the first Message of our new New York Mayor, we take a passage on Pavements.

Many of the pavements south of Forty-second street and those of some of the avenues are to-day impediments to travel. Our experience has developed the fact that wooden pavements, as heretofore construct ed, cannot be maintained, in such a condition as to make them useful or safe. All the streets and avenues in which this pavement has been laid, and those in which other pavements are in a condition to impede travel, ought to be repaved with trap or granite blocks—the only classes of pavements which have met the requirements of our commerce and traffic, and the best from a sanitary point of view. The authorities, however, are not in a position to remedy the evils from which we are suffering in these respects. The Charter, section 115, provides that "no street, avenue, or public place in the city of New York which has been once paved and the expense thereof paid for by the owners of the adjoining property by assessment shall hereafter be paved at their expense, nor shall any assessment therefor be imposed unless the same shall be petitioned for by a majority of the owners of the property (who shall also be the owners of a majority of the front feet) on the line of the proposed improvement." As the city has no authority to issue its bonds for paving streets except on the security of assessments to be imposed, in all cases where assessments are prohibited the city is prohibited from issuing bonds or borrowing money upon bonds for improving or renewing the pavement of any street or avenue in the city which has already been once paved.

Under the law the property-owners alone can apply the remedy, and it will be well for them to consider whether, if they delay taking action in the matter, the business in the streets upon which their property lies may not be driven away to other localities more favorable because provided with streets better paved.

Temperature of Dwellings.

General Morin read to the Academy of Sciences a "Note on Means for Maintaining in a Given Place a Temperature Nearly Constant, and for Moderating In Summer the Temperature of Dwelling Houses." The principle of the method is to renew the air regularly through the introduction by moderated aspiration of fresh air at constant temperature. It is known that at a depth of about 24 metres (about 79 feet) the internal temperature of the ground is constant. A supply of air is drawn from pits at this depth, or a less depth may suffice.

The general dispositions are as follows: The principal room, in which the temperature is to be kept constant, is preceded by another of nearly the same capacity (or only a small antechamber), which acts as a sort of dam for the entering air. This room should have walls, ceiling, and floor pretty thick. The floor and walls rest upon vaults; the walls are surrounded at a short distance by an isolating *enciente* of the same form, communicating with the vaults and the bottom of the aeration pits. Orifices made near the top of the ceiling of the room and that of the *enciente* are in direct but distinct communication with draw tubes (*tuyaux d'appel*) in which are burners kept lighted under constant pressure; their number varied according to the season, The air to be introduced into the principal room, into the subterranean vaults, and into the envelope, is taken from near the bottom of the pits by a special pipe of suitable size. The added building may be in a street, and may be lighted by double windows on the north side; the interval in the windows being in free communication with the isolating envelope. From Newton's law, the volume of air to be introduced will be proportional to the value it is judged convenient to assign to the fraction—

$$\frac{T-T'}{T'-t}$$

where T is the temperature external to the added building or its envelope, T' the internal temperature, and t the temperature of air to be introduced into it. —*Chemical News.*

Very Real Estate.

While men die, New York lives. Her merchant princes pass away, but the city survives the loss in the rush of an increasing population. The tremendous centralization of the business of the continent on this spot forces it to a ceaseless growth, and then the centering of trade in certain localities here leads to values which really seem fabulous.

In the more common streets of this city, land is worth from $160,000 to $200,000 per acre. In Broadway its value is increased to $2,000,000 per acre, but in Wall street it is worth vastly more, because this locality is the money heart of America. The land on which the Drexel building stands cost its present owners at the rate of fourteen millions per acre. It occupies the corner of Wall and Broad streets, which may be considered the most valuable corner on this continent—and yet, when I was a Broad street clerk, in 1840, this very place was occupied by a hat store. The corresponding value of property in this neighborhood has been illustrated by the recent sale of the William P. Turner estate. The price obtained proved that the price of the Drexel lot was none too dear. In fact, these dazzling figures are justified by the immensity of the transactions which occur here daily. Almost all the railroads on the continent (except New England) are managed within three hundred feet of this spot, and the general pressure of our immense financial system gives it a value which, a few years ago, could not have been dreamed of.—*Exch.*

Street Lanterns.

In reply to a letter on this subject to the London *Journal of Gas-Lighting* from Mr. Walker of Milwaukee, Mr. Magnus Ohren remarks:

"Mr. Walker says, 'I never could see the use of glass in the top of a lantern, it being the earth and not the heavens we want lighted.' This is true in one sense, but *are* the heavens lighted? Is any portion of the rays of light, thrown up from the burner lost? I answer—'No.' In streets of houses the rays are thrown upon the houses, and reflected back into the road, and from lamp to lamp, to the benefit of equestrians as well as pedestrians. Tin-top lanterns and reflectors are all very well to light a doorway or dangerous passagef but for public lighting they are a step back to the days of oil lighting and semi-darkness. I have not forgotten the sight (over thirty years ago) the first night the British Gas Company lighted up a road with glass-top lanterns, which we had exchanged for old tin-top ones. Instead of a concentrated light under the foot of the lantern, we had the rays of light thrown in all directions. The change was so great that every one was pleased with the improvement, and, from that time, tin-top lanterns soon became abolished. Now they are almost forgotten, I suppose we may expect them to be introduced as *something new.*"

The Gilbert Manufacturing Company filed a bill of equity, praying for an injunction restraining Abraham Bussing from using the company's improved Springfield gas machines. Judge Woodruff, after argument yesterday, decided that the injunction would be granted, unless Bussing gives bonds that he will pay any sum which may be recovered against him, pending the litigation in the case.—*Herald, Jan.* 24.

☞ *For other reading matter see page* 10.

THE AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY

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☞ All communications to be addressed to **"The Proprietors,"** No. 42 Pine Street, Room 18, New York.

TUESDAY, FEBRUARY 2, 1875.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

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SCRUBBING AND CONDENSATION.

In other columns will be found an elaborate communication from Mr. William H. St. John, in reference to his new method of scrubbing by means of the liquid products of condensation. We do not doubt that all our readers will be glad to have the views and conclusions, to their full extent, of a practical man who has given to these highly important branches of scrubbing and condensation such close, and we may add, such practically successful study, as this gentleman has done.

His view that the term *condensation*—and the notion it has largely conveyed, that coal-gas needs some treatment analogous to that of the vapors from alcohol and petroleum stills and the like—has been fallacious and mischievous; is a view which we think will be generally accepted by chemical students of gas.

OIL-DISCOVERIES IN NEW YORK.

There is nothing more suggestive of the great and assured future of this now grand national staple product, than the recent flowing wells opened in Cattaraugus County in New York State, in the neighborhood of Carrollton.

We have had the curiosity to examine, in connection with this new development, the new and magnificent map of the Oil Region, recently published by Henry E. Wrigley, of Titusville. A little care makes plain the grounds on which the parties proceeded who have made these interesting discoveries. It seems that they have been *four years* engaged in the explorations and experiments which have resulted so triumphantly. Such was their faith in a theory deduced from known facts.

We find that if a line be drawn from Franklin to the bend of the Allegheny river just below Tidioute, it passes nearly through Petroleum Centre, Shamburg, Pleasantville and Triumph, marking out very plainly what seems to be the axis of the great northern, or Venango and Warren county oil-field, and if prolonged actually strikes very near Carrollton, some *forty-five miles* beyond Tidioute, which has been hitherto, we believe, considered the extreme north-eastern point where oil could be found. As the average width of this oil-belt, where heretofore explored, may certainly be rated as at least five miles, this adds to its possibly productive area 225 square miles of territory, within any part of which it would seem worth while to seek at least for pumping, if not spouting wells.

When we consider the still so recent period of the discovery and development of the great southern field, we cannot but admit that it is reasonable to expect more of such discoveries; rather than to croak, as some still do, about the thing being sure to be "played out" in a few years.

PETROLEUM-GAS.

We were confident that by this issue of the Journal, it would have been in our power—after the complete Survey of the field that was desired, and particularly after having made some progress at least, in chemical investigation of actual petroleum-gas making, at some of the several large gas-works where it is now being employed—to enter seriously upon the grand topic of the chemistry of petroleum-gas.

Our readers may be assured that no fault of our own has delayed this business. We have held ourselves, and our apparatus, in readiness, at very brief notice, to plunge into the investigation; and the cause of the delay is to us untold and by us unknown.

At present therefore we shall have to be satisfied with presenting, to keep the subject alive, so to speak, some further figures, in hand, that seem worthy of being placed on record for future reference, and as having historical import.

In another column, therefore, will be found a table of figures giving the progress from 1869 to 1873 inclusive, from a public source; and we here give for comparison the figures of production for part of the same period, kindly furnished us by Mr. Paine of the Pittsburgh *National Oil Journal*. (Mr. Paine's figures for 1874, our readers have had once already.)

Average daily product each month in—

	1871	1872	1873	1874
January	13,497	18,825	20,407	37,653
February	13,306	15,965	21,725	29,836
March	12,912	14,890	21,461	24,629
April	12,866	15,403	21,384	25,958
May	13,187	17,326	25,044	25,121
June	13,678	16,371	26,449	———
July	14,725	16,702	27,983	33.337
August	14,922	17,739	30,198	30,049
September	15,398	16,681	31,809	28,021
October	15,653	14,272	30,403	29,669
November	15,487	21,287	33,049	28,720
December	15,418	20,825	34,980	———

On comparison it will be seen that the correspondence between the two sets of figures is not remarkable, except for 1873, in which year they are identical.

We find, however, in a little experiment to determine the cause of this, that notwithstanding the variations in the monthly figures for 1872, the monthly average is in one case 17,190 and the other 17,230; which is very close.

These tabular statements are very interesting to one who wishes to form a correct idea of the general past progress and history of this most wonderful trade; to furnish a basis for anticipation as to its future. We shall let each reader study out the matter in his own "prophetic soul."

GAS FOR RAILROAD CARS.

As some readers will recollect, we have years since taken the ground that the only combustible material that can be made safe to carry, or that ought to be carried, on railroad cars, is gas; which, in case of a crash, would escape or could be allowed to escape almost instantly, and not remain to kindle, or to feed, one of those dreadful fires wherein human beings are almost invariably burned alive. We urged that gas compressed in cylinders was the most suitable and available form in which to carry fuel for heating purposes, which in our severe climate is far more importaut even than lighting.

An article given in our columns to-day, from the London *Engineer*, will show that in other lands, where this subject is of greatly less importance than in this, they are going far ahead of us; so far, at least, as gas-lighting of such vehicles is concerned. It seems that a very dense oil-gas is found most suitable, and that the obstacle that would be anticipated by some, of condensation to liquid form by the compression, does not enter, at least not insuperably.

We do it without much hope that our single voice will avail much, but we feel it a solemn duty to urge again that this idea of *heating* and not merely lighting, cars by means of compressed petroleum-gas should be fairly tested. So long as railroad cars are built, as now, in such a tinder-like manner, the neglect of any precaution for safety such as this would be, is most culpable. Reservoirs of such compressed gas could

be carried, as before suggested by us, on the tops of the cars, and so constructed and arranged that in case of danger. their contents could escape almost in an instant, with one puff. Until the far better plan which we have so often begged and prayed for, a decade past, of building cars solely of wood chemically prepared so as to be practically incombustible, and entirely uninflammable—of which preparation there is one economical method well-known—until this most reasonable demand of ours shall receive some attention, we shall adhere to the claim that *gas-heating* must be employed.

So far as we know, however, none of our previous remarks or suggestions on these subjects, have been thought worthy even of citation, in the columns of any of our Railway or Engineering Journals. Under such circumstances, what *can* be done by us?

GAS-HOLDERS UNDER COVER.

After our notes on the New Haven Gas-Works had gone into print, we found that one matter which at the time interested us much, had been overlooked. We shall therefore take a trifling space now to supplement the subject.

The three holders under cover were spoken of, but we intended to have added some general impressions derived from observations and inquiries on the ground. The New Haven Company look upon this matter of protection of holders as one quite underrated in importance generally by our gas companies. Their experience is as follows: Greater durability: by reason of protection from storms of wind, and from snow and ice, so liable to be severe throughout our Northern, Eastern and Western States. Saving of condensation follows from this also. Even the absence of undue heating by direct sunshine in summer, both of the gas and of the sheets of the holder itself. The latter, in consequence no doubt of unequal expansions, warping, etc., causes numerous leaks in time, at rivet heads, in their experience. The prime cost they state to be actually about the same as the open holders with the usual iron frame-work.

The houses at New Haven, stand on the walls of the tank. Very little trouble is found in keeping the water in the tank free from ice. Gentlemen connected with the New Haven company claimed that in the memorable cases of the Cincinnati and Brooklyn holders, they would probably have been saved, had they been covered; and so in many other minor cases.

It seems to us that this certainly is a matter worthy of consideration by all our gas-engineers. We would not venture to lay down any law ourselves. The facts as stated in this case should, however, be known to all.

THE NEW (?) BISULPHIDE OF CARBON LIGHT.

In noticing this subject—which has been so much paraded of late—our readers will please not understand us as attaching any special value to the thing. Photographers *may* find some, but that is out of our scope. It is only that we wish to point out, what seems to have escaped other American Journals, that there seems precious little novelty in it. The French inventors must certainly have been aware of the article in the British *Journal of Photography*, by D. Winstanley, (how long since we fail to remember, but certainly some years ago) who proposed and described a lamp for burning bisulphide of carbon and oxygen together, for "actinic" purposes. The French inventors (see our notice in Excerpt No. 1336) use nitric oxide instead of oxygen, which is a distinction certainly, but not much of a difference, in a scientific view; and certainly does not entitle the Frenchmen to ignore the original English inventor altogether.

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DEATH.

On Monday morning, February 1st, we received the sad news of the death of Geo. W. Parsons, Esq., Supt. of the Rochester Gas-Works, in this State. He died on Sunday, January 31st. Owing to the lateness of the hour we are unable to give any further details, but will do so in full in our next issue.

Errata in Last Issue.

—Page 23—3d column—line 33 from top. For "H^3 from N gas" read: NH^3 from gas.

—Ditto, ditto, line 23 from bottom. For "T" read: G.

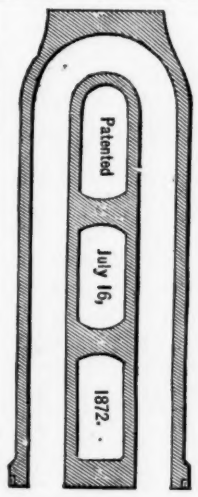
—Page 24—3d column—line 26 from bottom. For "three" read: 0·3.

—Ditto, ditto, line 25 from bottom. For "four" read: 0·4.

—Page 26—1st column—line 47 from top. For "Fig. 3" read: Fig. 2.

—Page 26. The Editor having been absent during the making up of the forms, an unlucky omission occurred, which renders the mathematical discussion on this page hard to understand. The portion that crosses the 2d and 3d columns should have been surrounded by ruled lines, giving it a tabular form. If this be done, the succession of paragraphs will become clear.

—Page 27—3d column—line 22 from bottom. For "tonic" read: toxic.



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New England ASSOCIATION OF GAS ENGINEERS.

THE ANNUAL MEETING OF THE ASSOCIATION WILL be held at the **TREMONT HOUSE,** Boston, on THURSDAY, February 11, 1875, at 12 o'clock, Noon.

374 GEORGE B. NEAL, Secretary.

SITUATION WANTED.—A YOUNG MAN OF LIBERAL education, who has spent some time in a large gas-works, would like a situation as Superintendent of a works making from 10,000 to 75,000 cubic feet daily, or would act as assistant in large works. Has good references as to character and ability. Understands Mechanical Drawing. Please address—P. O. Box 698, Worcester, Mass.

Gems and Generalities.

Prof. J. D. Steele of Elmira, now in Stuttgart, protests, like Mr. Northrop, against the educating of American youth abroad. He declares that foreign education has not even the merit of cheapness; that the students at Stuttgart, for instance, find board more expensive than the students at Syracuse University.

November 8, in pursuance of an act passed by the last Legislature, a pipe 750 feet in length and 10 inches in diameter was laid in the bed of the Hudson River, for the purpose of furnishing Croton water to the inhabitants of the annexed districts (Twenty-third and Twenty-fourth wards.) It was successfully laid by the Department of Public Works, and will furnish to the annexed wards over 1,000,000 gallons of water daily.

A very large branch of industry in New York is the manufacture of artificial flowers. Workers in it suffer more or less from the effects of arsenite of copper, phosphorus, verdigris, and other substances used in the coloring processes.

They can't keep herrings safe in Great Britain, the fish having almost entirely disappeared.

The average popular scientific lecturer is forced to give way out West to a peripatetic genius who exhibits a proficiency in moving his ears for all the world like a real ass.

Every dog has his day, and so has every dogma.

Over 100 bbls. of American petroleum were seized Jan. 7, by Inspector Battle, of the Canadian Inland Revenue Department, it failing to stand the test of 110°. It is represented as the most inferior article ever imported, and exploded at a test of 86°.

We learn from the newspapers that in the new tunnel through the Palisades back of Hoboken, "the workmen have found at different sections of the work lodes of iron, quicksilver and a large quantity of mineral specimens of parasitical nature."

The rock being *trap*, we suppose the universal parasites, in their wanderings, got caught.

Philadelphia proposes to convert its old water-works into a "fresh and salt water aquarium."

The estimated value of the lumber now on hand in the country, is $210,000,000 not including the large investments in pine lands.

The man who three years ago married a Newport belle says he begins to realize that a thing of beauty is a jaw forever.

It is the opinion of the Hartford *Post* that ill-arranged and ill-ventilated school-buildings and wrongly-managed homes and not excessive study are the chief causes of the breaking down of health in school children. To these evils the *Post* adds the too early pushing forward of children into society.

Consulting engineers have reported favorably on tunnelling the mouth of Newton Creek. The proposition was to construct a bridge over the creek. A tunnel would, however, cost less money, and be no impediment to navigation.

QUERY FOR RITUALISTS: Is a lighted kerosene lamp thrown at one's head, the same sort of thing as the mediæval "illuminated missile?"

Triumphs of Science.—A candle 13,000 feet distant shines with a light twenty thousand times more brilliant than do some nebulæ. Yet the constitution of these nebulæ has been determined. They are found to consist of hydrogen and nitrogen. We know the nature of worlds situated at distance inconceivable! And the relative ages of the stars we know. The white stars are the hottest and youngest. The yellow stars, including the sun, are older; while the colored stars are not so hot, and are still older.—*Scientific Press.*

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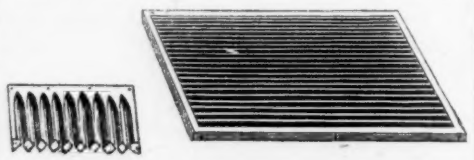

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Cast Iron Gas and Water Pipes—R. D. Wood & Co., Philadelphia Pa.....10
Cast Iron Gas and Water Pipe—Jno. McNeal & Sons, Burlington, N. J.....8
Franklin Foundry and Pipe Works—Jas. Marshall & Co., 23 Nineteenth street, Pittsburgh, Pa.....2
Gas Valves (Chapman) 75 and 77 Kilby St., Boston, Mass...8
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West End Supply Company—Chas. H. Brown, 25, 27 and 29 North 20th street, Phila, Pa.....4
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Gas Fixtures, Etc.—Archer & Pancoast Manufacturing Co. 67 Greene Street, above Broome, N. Y.....2
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Gasometers, &c.—Keystone Iron Works—2132 Filbert st., Philadelphia.....2
Gas Screens—American Gas Screen Manufacturing Co., Haverhill, Mass.....4
Jersey City Gas Meter Works, 14 Morris st., Jersey, N. J....8
Lime Hurdles.—Manhattan Lime Hurdle Co., Geo. W. Day, Treas., No. 3 Railroad Square, Haverhill, Mass.....2
Lava Tips and Scotch Tips—Charles H. Meyer & Co., 227 Chestnut street, Phil. Pa.....8
National Tube Works Co., 78 William St., N. Y.....7
Patent Conically Slotted Wood Trays—John L. Cheesman, 147 and 149 Avenue C., N. Y.....4
Patent Gas Exhauster—Smith & Sayre, 95 Liberty sttreet..4

GAS COALS.

Cannelton Coal Co. of West Virginia—J. Tatnall Lea, 325. Chestnut street, Phila, Pa.....3
Despard Coal Co.—Parmelee & Bros., Agents, 32 Pine st., New York.....7
Gas Coals—Bird, Perkins & Job, 27 South st., N. Y.....7
Monongahela Gas Coal—56 Exchange Place, Baltimore, Md. 6
New York and Cleveland Gas Coal Company—384 Penn Avenue, Pittsburgh, Pa.....6
Ohio Gas Cannel—G. Merryweather, Pine cor. Wm. sts.
Peytona Cannel Coal—S. E. Low, 58 Broadway, N. Y.....6
New York.....3
Red Bank Mining Company—Bird, Perkins & Job, 27 South st., N Y.....7
Sterling Coal—Freeman Butts, Cleveland, Ohio.....6
The Newburg Orrel Coal Co.—Chas. W. Hays, Agent in New York, Trinity Building, 111 B'way, Room 7.....6
Tyrconnell Gas Coal—52 S. Gay Street, Baltimore, Md.....6

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Continental Works—T. F. Rowland, Greenpoint.....6
Camden Iron Works, Camden, N. J.—Jesse W. Starr & Sons 5
Gloucester Iron Works—J. P. Michelion, Sec., 6 North 7th street, Phila., Pa.....4
National Foundry and Pipe Works—Wm. Smith, Carroll, Pike, Smallman & Wilkins streets, Pittsburg, Pa.....6
Pascal Iron Works—Morris, Taskar & Co., Philadelphia....12
Providence Steam and Gas Pipe Co., Providence, R. I.—H. A. Branch, Agent.....8

WATER METERS, PUMPS, ETC.

Cast Iron Pipes for Water and Gas—Riley A. Brick, 112 Leonard street, N. Y.....10
Valves for Water, Steam and Gas—Ludlow Valve Man'g Co., 940 River street, Troy, N. Y.....6
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Jersey City Fire Brick Works—J. H. Gautier & Co., Greene, Essex and Bergen sts., Morris Canal Basin, N. J.....8
Manhattan Clay Retort Works, 15th st., near Av. C, N. Y..8
Philadelphia Fire Brick Works, Vine and 23d sts., Phila....8
Retorts, Etc.—Geo. C. Hicks & Co., Baltimore Md.....

LAMPS, STOVES, PETROLEUM, ETC.

Patent Lamp Post—J. W. Graham, Chillicothe, Ohio, or A. M. Callender, office of this Journal.....9

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Analysis and Testing of Gas Coals—Prof. Henry Wurtz, 12 Hudson Torrace, Hoboken, N. J.....10
Architect and General Gas Engineer—William Farmer, 111 Broadway Room 95.....5
American Gas Works Construction and Supply Company—61 Broadway, N. Y.....3
Cements—S. L. Merchant & Company, 76 South st., N. Y...
Contractors for Gas Works, Etc.—Murray & Baker, Fort Wayne, Ind.....2
Fodell's System of Bookeeping—A. M. Callender & Co., 42 Pine st., New York.....10
Gas Engineer—B. E. Chollar, 914 Olive St., St. Louis, Mo...6
Gear Wheels—Scott, 98 Chambers St., N. Y.....5
Gas-Light Company of America, 63 and 64 Drexel Building, New York.....2
Kidd's Gas Consumers Guide—A. M. Callender & Co., 42 Pine Street, N. Y.....
Massachusetts Institute of Technology—Samuel Kneeland Boston, Mass.....
National Coal Gas Company—H. P. Allen, 4 Warren street New York.....6
Retort Setting and Working—E. S. Cathels, Montreal, Can. 8
School of Mines, Columbia College, East 49th st.....9
Screening Shovels—O. R. Butler, 126 Maiden Lane, N. J....7
Scientific and Practical Chemist and Geologist—Profetsor Henry Wurtz, 12 Hudson Terrace, N. J.....
Screening Shovels—G. W. Dean, 1358 Broadway, N. Y.....
Springfield Gas Machine—Corner Canal and Centre St.....
Slade's Automatic Fire Governor—Jas. Slade, Gas Works, Yonkers, N. Y.....
Scotch Fire Brick—S. L. Merchant & Co., 76 South Street, corner Maiden Lane, N. Y.....

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MANUFACTURERS OF

CHAPMAN GAS VALVES.

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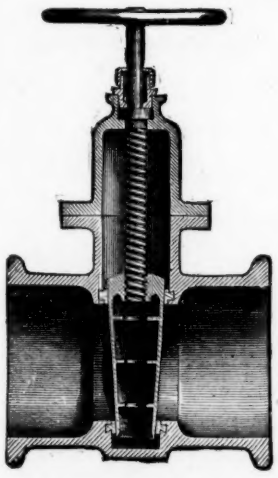

These Valves have been in use for several years, and are pronounced by all who have used them to be

The Best Gas Valves Ever Made.

They afford a direct passage the full size of the pipe. The seats are made of an alloy similar to BABBITT metal, specially prepared for the purpose, and superior to all other metals used for the seats of Gas Valves. It does not corrode under any circumstances to which it is exposed.

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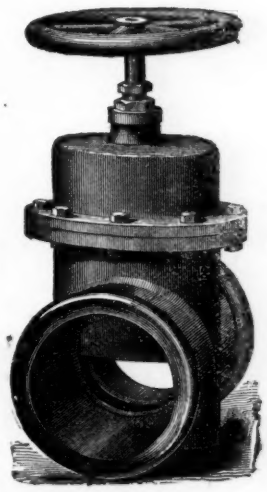

We refer to the following named Gas-Light Companies among the many that have used these Valves:

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GAS AND WATER VALVES ½ INCH TO 36 INCHES DIAMETER.

STEAM VALVES ½ INCH TO 12 INCHES DIAMETER.

357-tf

The Water Commissioners of Yonkers have agreed to accept the experts named by the Citizens' Committee, viz.: Julius W. Adams, Chief Engineer of the Brooklyn Water-Works, and William Ripley Nichols, chemist, of Boston. Prof. Nichols will make an examination and report first in regard to the purity of the water, and if favorable, then Mr. Adams, as an engineering expert, will examine the proposed reservoir sites.—*Jan.* 26.

Gas Bill for Brooklyn.—Mr. Coffey, of Kings, introduced a bill for Brooklyn. It provides for the appointment of a meter inspector and deputies, to examine the gas made by all the companies. The price would be fixed at $2.25 per 1000 feet, and the standard of illuminating power as 16 sperm candles.

BUTLER'S PATENT
Coke and Coal
SCREENING SHOVELS

MADE FROM BEST MALLEABLE IRON AND STEEL.

FURNISHED WITH LONG OR D HANDLES

Perfect in their operation, a very strong, and from their great durability vastly more economical than any substitute. Refer to all the principal gas Companies in the country, who acknowledge them as the "ne plus ultra of Coke Screening Shovels.

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☞ I still retain the original SABBATON LETTERS PATENT, and have granted no rights or privileges to any other parties.

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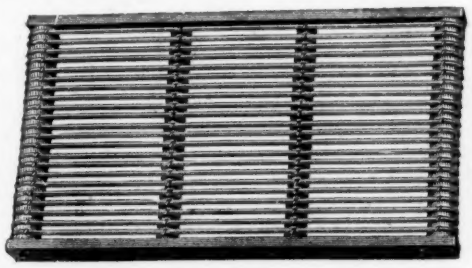
LIME HURDLES
Are LIGHT, STRONG, and DURABYE.



Will purify MORE GAS with same quantity of Lime than any Tray in use.

They readily command themselves to the judgment of every practical Gas Engineer as a SUPERIOR SCREEN.

Manufactured and shipped to all parts of the country by

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373-6m

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HAVING JUST RECEIVED FROM MR. E. S. CATHELS of Montreal, a fresh supply of his CAS CONSUMERS MANNAL AND RETORT SETTING pamphlet, we can now fill all orders for the same at once. Mr. Cathels has decided to reduce the price to correspond with the times, therefore for the future either of the above works will be forwarded, post paid, for **25** cents, or one of each for **50** cents. Send all orders to

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$30 per Dozen.

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NEW PATENT (1873)

Screening Scoop SHOVEL

FOR COKE, COAL, ASHES, AND OTHER SUBSTANCES.

The frames are 12 by 18 inches, with seven bars, and are made of the best malleable Iron. They can be wired between bars by an arrangement of holes a quarter of an inch apart, by an ordinary person, to screen any size substance desired. They are warranted to be the most durable and practical Screening Shovel made, or money refunded.

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Price, $30 per Dozen.

Sample sent gratis to any Company, if desired.

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369-6m

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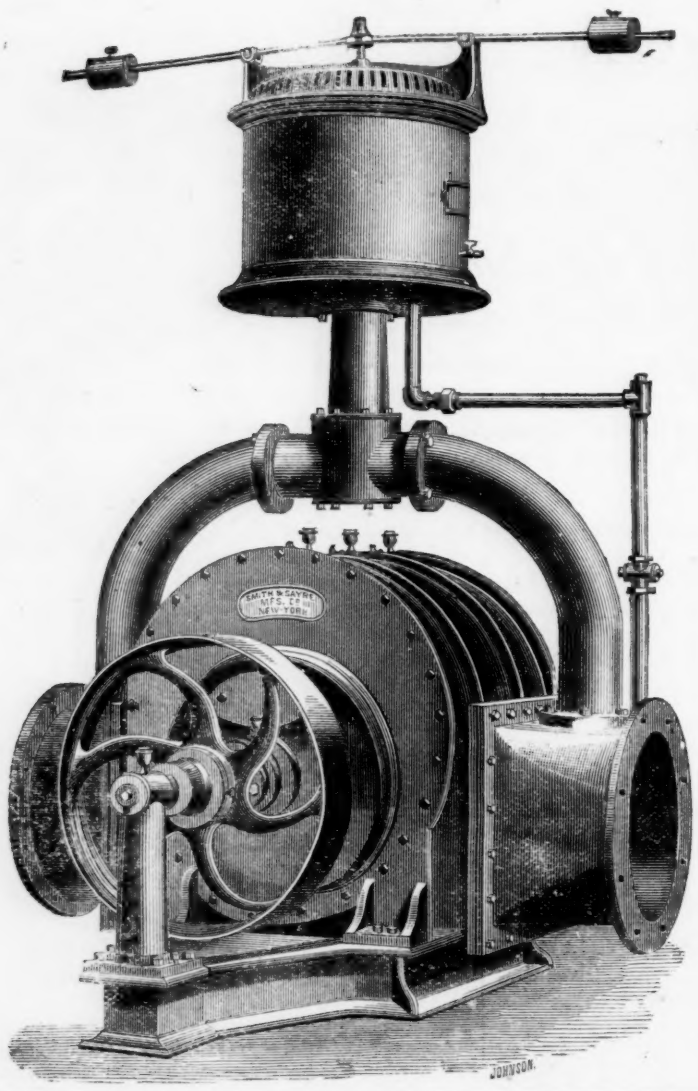
A YOUNG MAN OF LIBERAL EDUCATION, WHO HAS spent many years in the study of gas, and working in a large gas works, desires a situation as Superintendent of a works making 10,000 to 50,000 cubic feet daily. Has good reference as to ability; or would act as Assistant in large works. Would prefer a situation on the staff of a gas works builder—draws well, and has experience in setting up apparatus. Address, stating salary, C. P. V., care of W. B. CARPENTER & Co., Cincinnati, Ohio. 372

SMITH & SAYRE MANUFACTURING COMPANY.

The Mackenzie Patent Gas Exhauster

And Patent Compensator.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-jo ints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

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The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary fan. The Cupolas are manufactured in sizes to melt from 1 to 20 tons per hour, will save one quarter of the time required by the old style Cupola and 33 per cent fuel. Address

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[Reported Expressly for this Journal.]

FEBRUARY 2, 1875.

DELIVERED IN NEW YORK.

English Cannel.			
Ince Hall	$17 00	@	18 00
Kirkless Hall	16 50	@	17 00
English Caking Coals.			
Newcastle Gas	$12 00	@	00 00
Liverpool caking	11 50	@	12 00
British Province Coals.			
Pictou	2 50		
Block House—At Mines, $2 12, Gold	0 00		
Caledonia—At Mines, $2 00, Gold	0 00		
Little Glace Bay—At Mines, 1 87½, Gold	2 00		
Lingan—At Mines, $2 25, Gold	0 00		
Sydney—Old Mine	3 00		
" Reserve Mine	2 25		
" International	— —		

(Duty, 75 cents per ton, gold. Freight to New York $2 25 currency. Cost of above coals delivered in New York, $5 25 @ $6 00½, currency.)

Pennsylvania Coals.			
Penn Gas Coal—At Amboy	$7 00	@	0 00
Westmoreland—At Amboy	7 00	@	0 00
(In New York both the above coals $7 50)			
Shafton	7 50	@	0 00
Youghiogheny	7 75	@	0 00
West Virginia Coals.			
Murphy Run	$7 40	@	0 00
Despard	7 40	@	0 00
West Fairmont	7 40	@	0 00
American Gas Coal	7 40	@	0 00
Fairmont	7 40	@	0 00
Newburgh Orrel	7 40	@	0 00
Pinnickinick	7 40	@	0 00
Cloverhill of Virginia	6 00	@	6 50
McKenzie Compound Mixture			— —
American Cannel Coals.			
Peytona of West Virginia	$12 50	@	00 00
Darlington of Pennsylvania			— —
Cannelton Cannel			12 50
Red Bank—at Philadelphia			7 60
" —at South Amboy			9 00
Asphalts.			
Albertite of New Brunswick	$— 00	@	— 00
Ritchie Mineral of West Virginia	18 00	at	Balt'e.
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COKE BARROWS,

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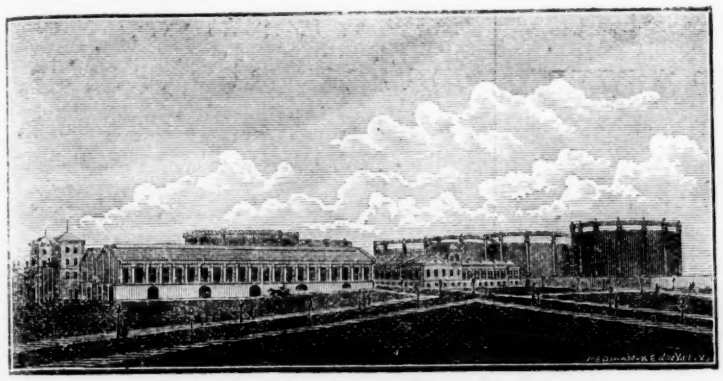
42 Pine Street, New York, Room 18,



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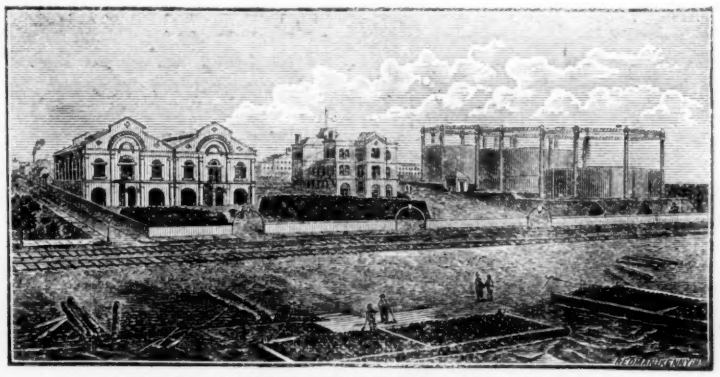

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W. W. SCARBOROUGH, President Cincinnati Gas-Light Company, Cincinnati, Ohio.
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21st Street and Avenue A, New York Gas Works.

☞ Immediate arrangements are urged, as the demand for the prepared composition is increasing *so rapidly* that delays in supply may occur.

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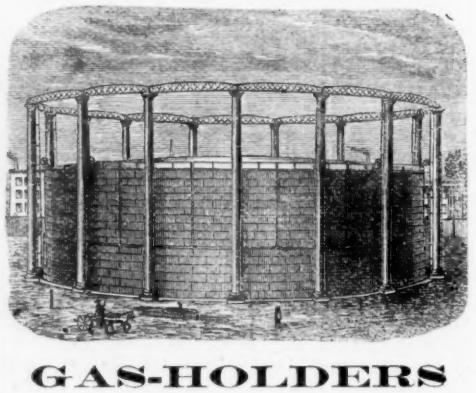

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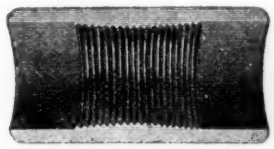

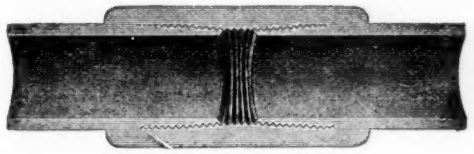

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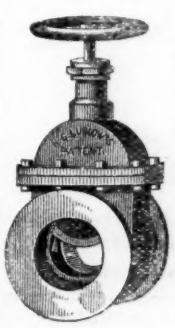

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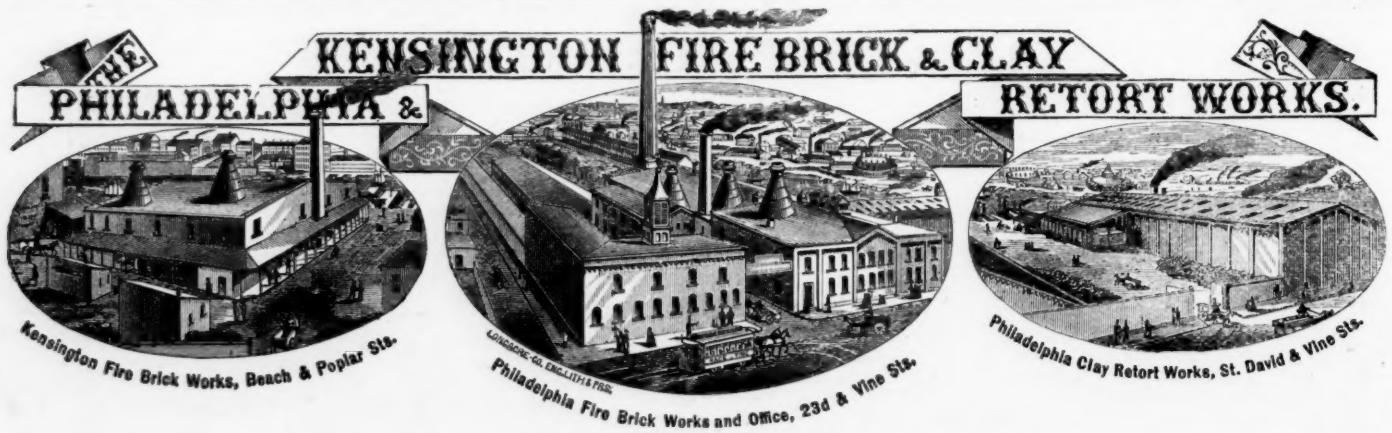
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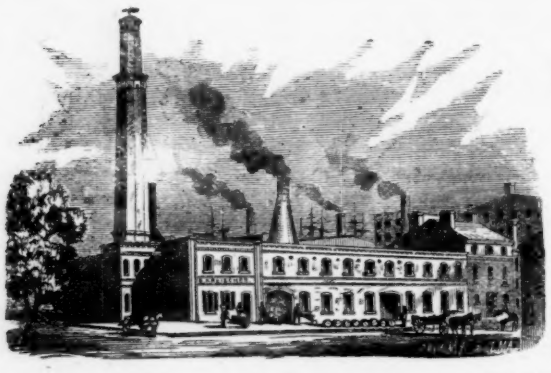

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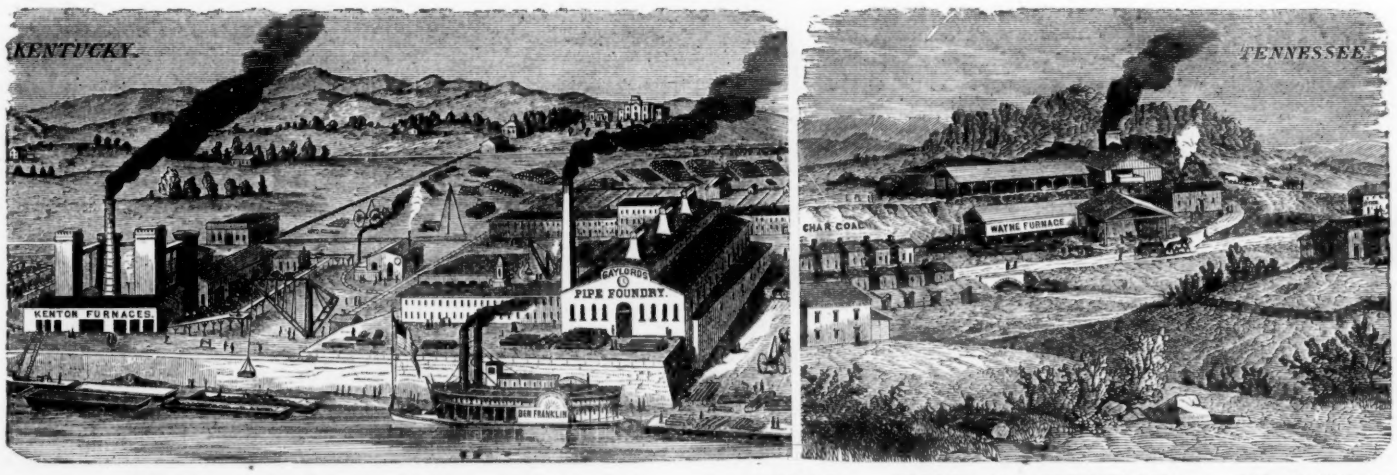

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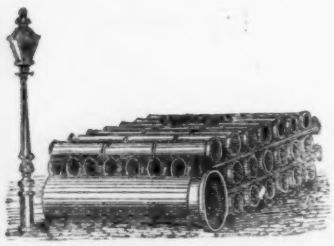

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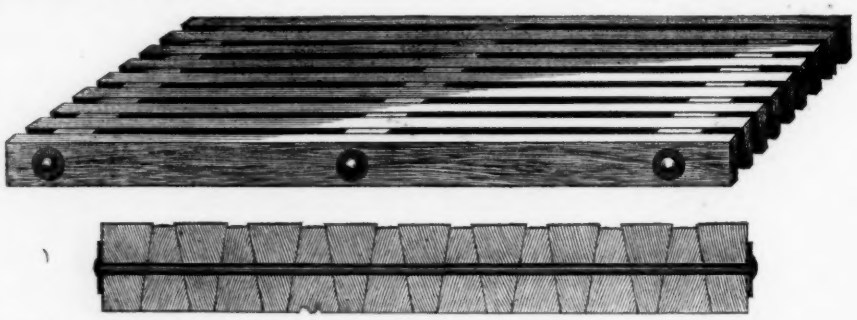

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